CLAIMS

1. An electronically commutated motor that is adapted to be powered from an AC voltage source (11) and that comprises:

a stator having at least one winding phase (L1, L2, ..., Ln);

a rotor magnetically coacting with that stator;

a rectifier (38) which serves to generate, from an AC voltage (U_{AC}) at said AC voltage source (11), a pulsating DC operating voltage (U_B);

a DC link circuit (15) having a positive lead (30) and a negative lead (32), said pulsating DC voltage from said rectifier being applied between said positive and negative leads;

a bridge circuit (28), connected to the DC link circuit (15) and serving to supply current to the at least one winding phase, said bridge circuit comprising a switching element (50, 52) that is controllable by a control voltage (U_{ST}) that is lower than the operating voltage (U_B) to be switched by said switching element; and

an auxiliary circuit (34, 34') for generating, from the pulsating DC voltage (U_B) at the DC link circuit (15) and from the AC voltage (U_{AC}), said control voltage (U_{ST}) for controlling the switching element (50,52), said control voltage being lower than the pulsating DC voltage (U_B) by a predetermined voltage difference(U_Δ).

2. The motor according to claim 1, wherein

the switching element is a p-channel MOSFET (50) having a source electrode (S) which is connected to the positive lead (30) of the DC link circuit (15) and having a gate electrode (G) to which the control voltage (U_{ST}) is applied, in order to turn on the p-channel MOSFET.

3. The motor according to claim 1, wherein

the auxiliary circuit (34; 34') further comprises a first capacitor (100), serving to provide the control voltage (U_{ST}), said capacitor (100) being connected in series with a diode (102) between the positive lead (30) of the DC link (15) and a first one (106) of two terminals of said AC voltage source (11).

4. The motor according to claim 3, further comprising,

connected in parallel with the first capacitor (100), a voltage limiter (108) for limiting the voltage at the first capacitor (100) to said predetermined voltage difference (U_Δ).

5. The motor according to claim 4,

wherein the voltage limiter comprises a Zener diode (108).

6. The motor according to claim 3, further comprising

a resistor (110), connected in parallel with the first capacitor (100), which serves to minimize charge oscillations at the first capacitor (100).

7. The motor according to claim 3, further comprising

a second capacitor (104), connected in series with the first capacitor (100) and the AC voltage source (11).

8. The motor according to claim 3,

wherein the auxiliary circuit (34') further comprises:

a third capacitor (100') for providing the control voltage, said third capacitor being connected between the positive lead (30) of the DC link (15) and a second one (108) of said two terminals of the AC voltage source (11); and

a second diode (102') connected between the third capacitor (100') and said second one (108) of the two terminals of the AC voltage source (11).

9. The motor according to claim 1, further comprising

a commutation logic unit (20); and

a plurality of control elements (60, 62) adapted to be controlled by said commutation logic unit (20) and which in turn serve to control the switching element (50, 52).

10. The motor according to claim 9, further comprising

a constant-current source (36) controllable by the commutation logic unit,

wherein the control elements are implemented as bipolar transistors (60, 62) and the bases of those bipolar transistors are connected via a resistor (70) to the positive lead (30) of the DC link circuit, the current through the resistor (70) being determined by said constant-current source (36).

11. The motor according to claim 10, wherein

the constant-current source (36) comprises a high-voltage resistant transistor (66), connected as a constant-current source, the collector of which is connected to the resistor (70) and the base of which is connected to an output of the commutation logic unit (20).

12. An electronically commutated motor that is adapted to be powered from an AC voltage source (11) and that comprises:

a stator having at least one winding phase (L1, L2, ..., Ln);

a permanent-magnet rotor magnetically coacting with that stator;

a rectifier (38) which serves to generate, from an AC voltage (U_{AC}) at the AC voltage source (11), a pulsating DC operating voltage (U_B);

a DC link (15) having a positive lead (30) and a negative lead (32), said pulsating DC voltage from said rectifier being applied between said positive and negative leads;

a bridge circuit (14) connected to an output of the DC link (30, 32) and supplying current to the at least one winding phase (L1, L2, ...), which bridge circuit (14) comprises

at least one n-channel MOSFET (52) on a side connected to the negative lead (32) and at least one p-channel MOSFET (50) on a side connected to the positive lead (30); and

a circuit (34) for generating an auxiliary voltage (U_{ST}) that is negative with respect to the positive lead (30) of the DC link and that renders a p-channel MOSFET (50) of the bridge circuit (14) conductive when said auxiliary voltage is applied to the gate of said p-channel MOSFET.

13. The motor according to claim 12, wherein

the auxiliary voltage (U_{ST}) is generated at a first capacitor (100) one electrode (E2) of which has substantially the potential of the positive lead (30) of the DC link.

14. The motor according to claim 13, further comprising

a Zener diode (108), connected in parallel with the first capacitor (100) in order to limit the voltage at the first capacitor (100) to a predetermined value (U_{Δ}).

15. The motor according to claim 13, further comprising

a resistor (110), arranged in parallel with the first capacitor (100) in order to reduce charge oscillations at the first capacitor (100).

16. The motor according to claim 13,

wherein, for current limiting, a second capacitor (104) is connected in series with the first capacitor (100) and the AC voltage source (11).

17. The motor according to claim 12,

wherein the auxiliary circuit (34') comprises:

a third capacitor (100') for generating the control voltage, which is connected between the positive lead (30) of the DC link circuit (15) and the other terminal (108) of the AC voltage source (11); and

a second diode (102') connected between the third capacitor (100') and the other terminal (108) of the AC voltage source (11).

18. The motor according to claim 12,

wherein bipolar transistors (60, 62) controlled by a commutation logic unit (20) of the electric motor (10) are provided in order to control the p-channel MOSFETs (50).

19. The motor according to claim 18, wherein

the bases of the bipolar transistors (60, 62) are connected via a resistor (70) to the positive lead (30) of the DC link, the current through the resistor (70) being determined by a constant-current source (36) controllable by the commutation logic unit (20).

20. The motor according to claim 19, wherein

the constant-current source (36) comprises a high-voltage resistant transistor (66), connected as a constant-current source, whose collector is connected to the resistor (70) and whose base is connected to the commutation logic unit (20).